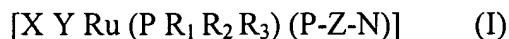


### Amendments to the Claims

1. (Original) Process for hydrogenating a substrate containing a carbon-heteroatom double bond, which includes the step of reacting the substrate with hydrogen in the presence of a hydrogenation catalyst and of a base, characterized in that the hydrogenation catalyst is a transition metal complex of the formula (I)



where

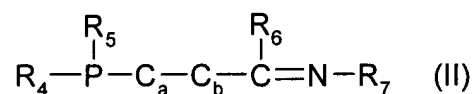
X, Y are each independently a hydrogen atom, halogen atom, C<sub>1-8</sub>alkoxy or C<sub>1-8</sub>acyloxy group, or a coordinatively bound organic solvent molecule containing at least one heteroatom having at least one free electron pair, for example in the form of

(cyclo)alkyl/aryloxy, -thio or

-amino groups, in which case the charge of the resulting cationic complex is balanced by an anion, for example CN<sup>-</sup>, OCN<sup>-</sup>, PF<sub>6</sub><sup>-</sup> or F<sub>3</sub>C-SO<sub>2</sub>O<sup>-</sup>,

R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> are each independently an alkyl, alkyloxy, alkylthio, dialkyamino, cycloalkyl, cycloalkyloxy, cycloalkylthio, dicycloalkylamino, aryl, aryloxy, arylthio or diarylamino group, optionally substituted by 1,2 or 3 radicals which are each independently selected from C<sub>1-4</sub>alkyl groups and C<sub>1-4</sub>alkoxy groups, or one of the R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> radicals is as defined above and the remaining 2 radicals which, linked either via an oxygen bridge or directly to the phosphorus atom, form, including the phosphorus atom, a 4- to 8-membered, optionally substituted ring,

P-Z-N is a bidentate ligand which contains an sp<sup>2</sup>-hybridized nitrogen atom and is of the formula (II)



where

R<sub>4</sub>, R<sub>5</sub> are each independently a linear, branched or cyclic C<sub>1-8</sub>alkyl or C<sub>2-8</sub>alkenyl group, optionally substituted; C<sub>6-18</sub>aryl, C<sub>3-18</sub>heteroaryl, C<sub>3-8</sub>cycloalkyl, (C<sub>1-8</sub>Alkyl)<sub>1-3</sub>-

(Hetero)Aryl, optionally substituted, whereby possible substituents are halogen, organohalogen group, O(C<sub>1-8</sub>)alkyl, N(C<sub>1-8</sub>alkyl)<sub>2</sub>; or R<sub>4</sub> and R<sub>5</sub> together are a saturated or aromatic ring composed of 5 to 10 atoms including the phosphorus atom,

C<sub>a</sub>, C<sub>b</sub> are each a part of an aromatic, optionally substituted (hetero)aryl having at least 6  $\pi$ -electrons,

R<sub>6</sub> is a hydrogen atom, a linear, branched or cyclic C<sub>1-10</sub>alkyl or C<sub>2-10</sub>alkenyl group, optionally substituted, an aromatic ring, optionally substituted, a -OR<sub>6</sub><sup>•</sup> or -NR<sub>6</sub><sup>•</sup>R<sub>6</sub><sup>•</sup> radical, where R<sub>6</sub><sup>•</sup> and R<sub>6</sub><sup>•</sup> are as defined for R<sub>6</sub>,

R<sub>7</sub> is a hydrogen atom, a linear, branched or cyclic C<sub>1-10</sub>alkyl or C<sub>2-10</sub>alkenyl group, or an R<sub>7</sub><sup>•</sup>CO or R<sub>7</sub><sup>•</sup>SO<sub>2</sub> radical where R<sub>7</sub><sup>•</sup> is a C<sub>1-8</sub>alkyl or aryl group,

or

R<sub>6</sub> and R<sub>7</sub> together are an unsaturated (hetero)cycle composed of 5 to 10, optionally substituted ring atoms, including the carbon and the nitrogen atom to which R<sub>6</sub> and R<sub>7</sub> are bonded, and optionally including further heteroatoms.

2. (Original) Process according to Claim 1, characterized in that X, Y in the formula (I) are each independently a hydrogen atom or a halogen atom.

3. (Original) Process according to Claim 2, characterized in that X, Y in the formula (I) are each a halogen atom, in particular chlorine.

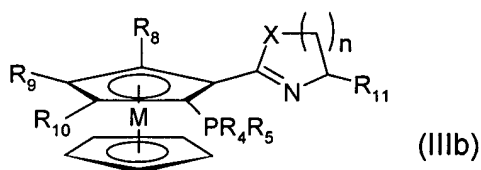
4. (Previously presented) Process according to Claim 1, characterized in that R<sub>1</sub>, R<sub>2</sub>, R<sub>3</sub> in the formula (I) are each independently a methyl, ethyl, propyl, i-propyl, n-butyl, i-butyl, sec-butyl, tert-butyl, cyclopentyl, cyclohexyl, phenyl, o- or p-tolyl, p-isopropylphenyl or mesityl group.

5. (Previously presented) Process according to Claim 1, characterized in that R<sub>4</sub>, R<sub>5</sub> in the formula (I) are each independently a radical selected from methyl, ethyl, n-propyl, i-propyl, n-butyl, i-butyl, cyclohexyl, phenyl, o- or p-tolyl, mesityl,  $\alpha$ - or  $\beta$ -naphthyl.

6. (Previously presented) Process according to Claim 1, characterized in that  $C_a$ ,  $C_b$  in the formula (II) are part of a pure 6  $\pi$ -electron system in the form of optionally substituted benzene or in the form of an optionally substituted cyclopentadienide ion as a ligand of a metallocene.

7. (Previously presented) Process according to Claim 1, characterized in that  $R_6$  and  $R_7$  in the formula (II) together are an unsaturated heterocycle composed of 5 to 10, optionally substituted ring atoms, including the carbon and the nitrogen atom to which  $R_6$  and  $R_7$  are bonded, and optionally including further heteroatoms.

8. (Previously presented) Process according to Claim 1, characterized in that the ligand of the formula (II) is a ligand of the general formula (IIIb)



where

$n = 1$  or  $2$ , preferably  $1$ ,

$M = Fe, Ru, Os$ , preferably  $Fe$ ,

$X = O, S$  or  $N$ , preferably  $O$ ,

$R_4, R_5$  are each radicals corresponding to the definition given under formula (II),

$R_{11}$  is a  $C_{2-8}$ alkoxyalkyl,  $C_{7-19}$ aralkyl,  $C_{3-18}$ heteroaryl,  $C_{4-19}$ heteroaralkyl,

$(C_{1-8}alkyl)_{1-3}-C_{6-18}(hetero)aryl$ ,  $(C_{1-8}alkyl)_{1-3}-C_{6-18}cycloalkyl$ ,  $C_{3-8}cycloalkyl$ ,

$C_{3-8}cycloalkyl-C_{1-8}alkyl$  radical, or preferably  $C_{1-8}alkyl$ ,  $C_{6-18}aryl$  radical, in particular *i*-

propyl, and the radicals mentioned may be substituted by one or more heteroatoms such

as  $Hal, Si, N, O, P, S$ , or the radicals may have one or more heteroatoms such as  $Si, N, O,$

$P, S$  in their carbon framework,

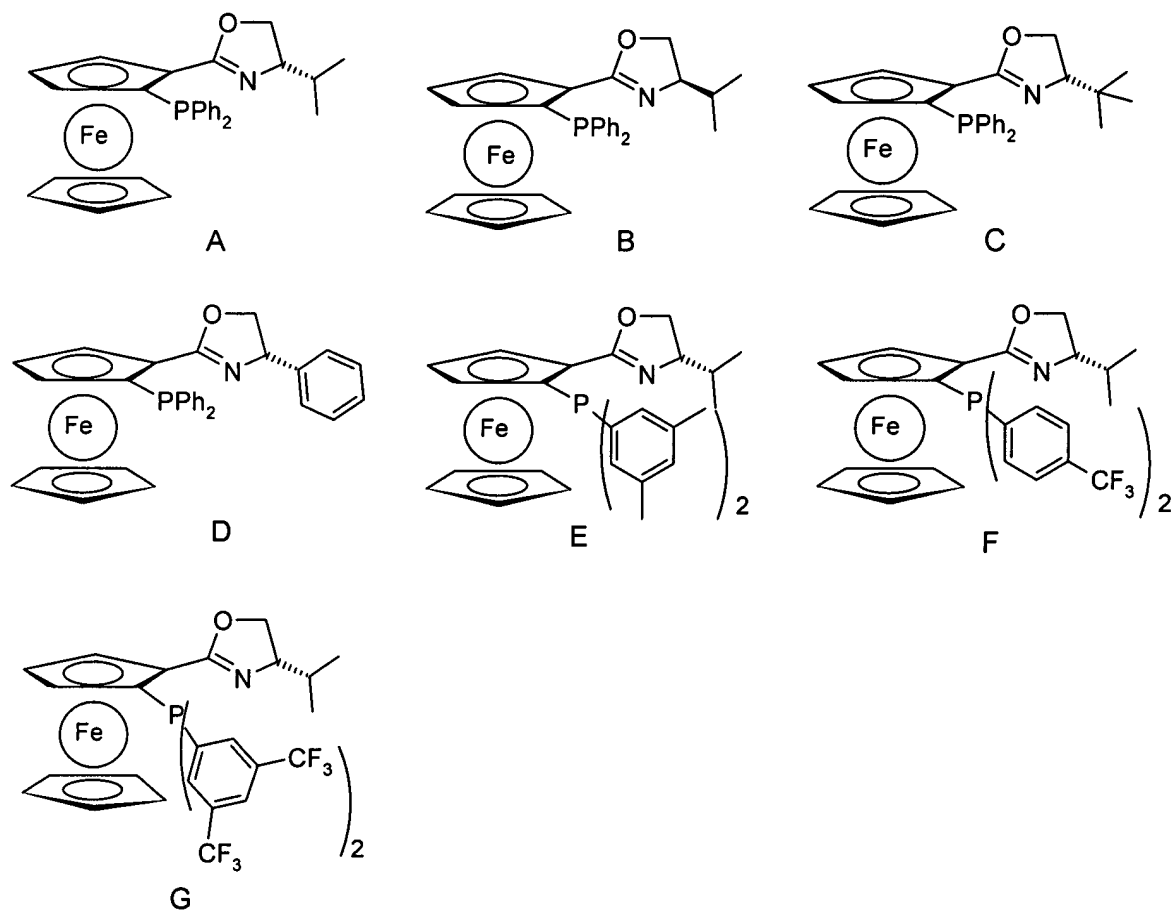
$R_{8,9,10}$  are each independently a  $C_{1-8}alkyl$ ,  $C_{2-8}alkoxyalkyl$ ,  $C_{6-18}aryl$ ,  $C_{7-19}aralkyl$ ,

$C_{3-18}heteroaryl$ ,  $C_{4-19}heteroaralkyl$ ,  $(C_{1-8}alkyl)_{1-3}-C_{6-18}(hetero)aryl$ ,  $C_{3-8}cycloalkyl$ ,

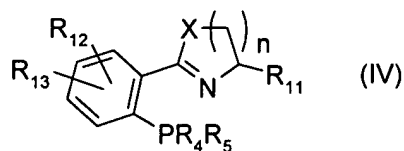
$(C_{1-8}alkyl)_{1-3}-C_{6-18}cycloalkyl$ ,  $C_{3-8}cycloalkyl-C_{1-8}alkyl$  radical, or preferably  $H$ , and the

radicals mentioned may be substituted by one or more heteroatoms such as Hal, Si, N, O, P, S, or the radicals may have one or more heteroatoms such as Si, N, O, P, S in their carbon framework.

9. (Original) Process according to Claim 8, characterized in that the ligand of the formula (IIIb) is selected from the ligands A to G:



10. (Previously presented) Process according to Claim 1, characterized in that the ligand of the formula (II) is a ligand of the general formula (IV)



where

$n = 1$  or  $2$ , preferably  $1$ ,

$X = O, S$  or  $N$ , preferably  $O$ ,

$R_4, R_5$  are each radicals corresponding to the definition given under formula (II),

$R_{11}$  is a  $C_{2-8}$ alkoxyalkyl,  $C_{7-19}$ aralkyl,  $C_{3-18}$ heteroaryl,  $C_{4-19}$ heteroaralkyl,

$(C_{1-8}alkyl)_{1-3}-C_{6-18}(hetero)aryl$ ,  $(C_{1-8}alkyl)_{1-3}-C_{6-18}cycloalkyl$ ,  $C_{3-8}cycloalkyl$ ,

$C_{3-8}cycloalkyl-C_{1-8}alkyl$  radical, or preferably  $C_{1-8}alkyl$ ,  $C_{6-18}aryl$  radical, in particular  $i$ -

propyl, and the radicals mentioned may be substituted by one or more heteroatoms such

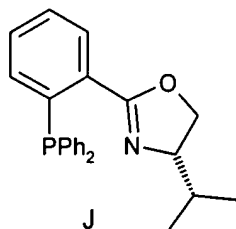
as  $Hal, Si, N, O, P, S$ , or the radicals may have one or more heteroatoms such as  $Si, N, O,$

$P, S$  in their carbon framework,

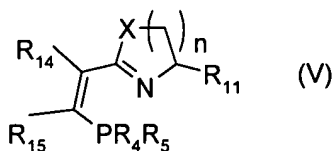
$R_{12}, R_{13}$  are each independently a  $C_{1-8}alkyl$ ,  $C_{1-4}alkoxy$  radical, or preferably  $H$ , or are

together a fused cycloalkyl or aryl ring.

~~12. 11.~~ (Renumbered, Currently amended) Process according to ~~Claim 11,~~  
Claim 10, characterized in that the ligand of the formula (IV) corresponds to the formula  
J:



~~13. 12.~~ (Renumbered, Currently amended) Process according to Claim 1,  
characterized in that the ligand of the formula (II) is a ligand of the general formula (V)



where

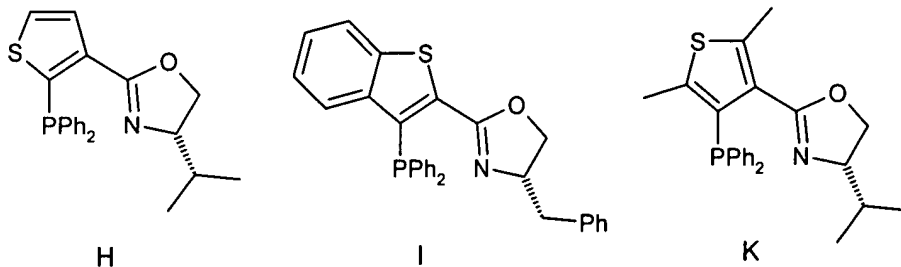
~~$n, X, R_4, R_5$  and  $R_{11}$  are each as defined for formula (IV),  $n = 1$  or  $2$ , preferably  $1$ ,~~

$X = O, S$  or  $N$ , preferably  $O$ ,

R<sub>4</sub>, R<sub>5</sub> are each radicals corresponding to the definition given under formula (II),  
R<sub>11</sub> is a C<sub>2-8</sub>alkoxyalkyl, C<sub>7-19</sub>aralkyl, C<sub>3-18</sub>heteroaryl, C<sub>4-19</sub>heteroaralkyl,  
(C<sub>1-8</sub>alkyl)<sub>1-3</sub>-C<sub>6-18</sub>(hetero)aryl, (C<sub>1-8</sub>alkyl)<sub>1-3</sub>-C<sub>6-18</sub>cycloalkyl, C<sub>3-8</sub>cycloalkyl,  
C<sub>3-8</sub>cycloalkyl-C<sub>1-8</sub>alkyl radical, or preferably C<sub>1-8</sub>alkyl, C<sub>6-18</sub>aryl radical, in particular i-  
propyl, and the radicals mentioned may be substituted by one or more heteroatoms such  
as Hal, Si, N, O, P, S, or the radicals may have one or more heteroatoms such as Si, N, O,  
P, S in their carbon framework, and

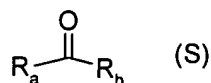
R<sub>14</sub> and R<sub>15</sub> together are a 6  $\pi$ - or 10  $\pi$ -electron heteroaromatic system, optionally substituted by linear or branched C<sub>1-8</sub>alkyl radicals, and possible heteroatoms are N, O, or S.

14. 13. (Renumbered, Currently amended) Process according to ~~Claim 13~~,  
Claim 12, characterized in that the ligand of the formula (V) corresponds to one of the  
 formulae H, I and K:



15. 14. (Renumbered, Original) Process according to Claim 1, characterized in that  
 the substrate to be hydrogenated is a prochiral imine or ketone.

16. 15. (Renumbered, Currently amended) Process according to ~~Claim 15~~,  
Claim 14, characterized in that the substrate to be hydrogenated is a prochiral ketone of  
 the general formula (S)

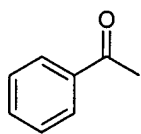


where R<sub>a</sub> and R<sub>b</sub> are each independently a hydrogen atom, a cyclic, linear or branched  
 C<sub>1-8</sub>alkyl or C<sub>2-8</sub>alkenyl group, or an monocyclic or polycyclic aryl or heteroaryl group,

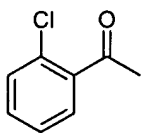
optionally substituted by linear or branched C<sub>1-8</sub>alkyl, C<sub>1-8</sub>alkoxy groups, or halogen atoms.

~~17.~~ 16. (Renumbered, Currently amended) Process according to ~~Claim 16,~~  
Claim 15, characterized in that the substrate to be hydrogenated is a prochiral monocyclic  
or polycyclic aryl ketone or heteroaryl ketone, optionally substituted by linear or  
branched C<sub>1-8</sub>alkyl, C<sub>1-8</sub>alkoxy groups, or halogen atoms.

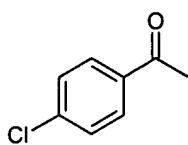
~~18.~~ 17. (Renumbered, Currently amended) Process according to ~~Claim 17,~~  
Claim 16, characterized in that the substrate to be hydrogenated is selected from one of  
ketones 1 to 7:



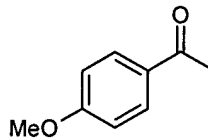
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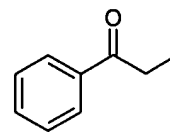
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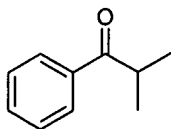
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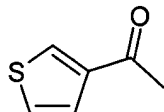
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